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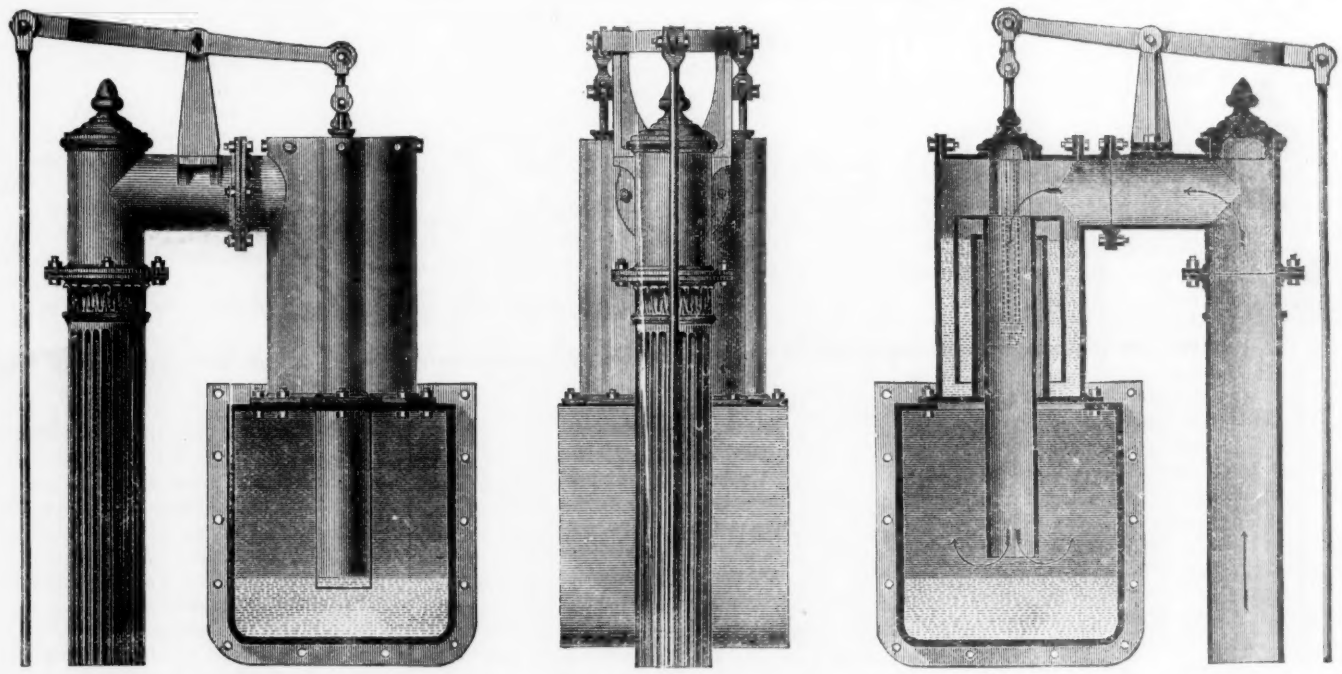

Improved Dip-Pipe.

According to promise, I now present to your readers another simple arrangement for removing the seal of dip-pipes in hydraulic mains.

The priucipal novelty of this invention is the arrangement for raising and lowering the dip-pipe.

On the upper end of the movable dip-pipe there is cast an inverted cup, which fits into the cup of the upper chamber, and so forms a perfect seal.

The upper end of this dip-pipe is cast open, through which the gas must pass on its way from the retort to the hydraulic main.

The apparatus for raising and lowering the dip-pipe, which appears at first sight to be somewhat complicated, is on the contrary very simple, and will be readily understood from the following description:

On the top of the upper chamber there are fitted two small dip-pipes, each about one and a quarter inch in diameter, which run down in the two recesses formed on the inner side of the chamber, and into the tar in cup to form a seal. These tubes dipping into the tar being used in place of stuffing boxes, thereby allowing free motion to the rods, and leaving no chance for leakage of gas. At the lower ends of these tobes there are two lugs, which are cast on the outer sides of the inverted cup of dip-pipe.

Down the centex of each tube there are placed two wrought iron rods about five-eighth of an inch in diameter, which are secured to the lugs below on inverted cup, and also to the arms of the wrought iron lever above.

The lever which is placed on the top of the bridge-pipe for the purpose of raising and lowering the dip-pipe, is formed with two arms so as not to interfere with the removal of the stoppers or the cleaning out of pipes, etc. One of these arms is attached to the five-eighth inch tube rod on the right of the movable dip-pipe, and the other is attached to the tube rod on the left.

There is an adjustable stop fixed on the apparatus, for the purpose of adjusting the dip to any gauge required.

This dip pipe has some advantages over the one which I described in your issue ef February 16, that are very important, viz.:

The whole of the seals in the hydraulic main can be easily adjusted to any degree of gauge.

By this means we can readily counteract any variation of the dip, when caused from the settlement of hydraulic main, or the distance from exhauster, and consequently save a large amount of gas, and also prevent a large accumulation ef carbon forming in the retosts.

The dip pipes which stand nearest to the exhauster require to be set lower than those which stand further away on the same line of pipe.

When the mains are short and large the variation of the drafts in them will not amount to much, but when the mains are long and small the variation will be very great, and consequently all the dips should be carefully set to suit.

The whole of the dip pipes in a retort house should be carefully adjusted by means of a pressure-gauge, at least once a month, if the very best results are required, for there will be a constant variation of draft in the dip-pipes, caused from the settlement of mains, and firing up or letting down of benches, etc.

When using the ordinary caking coals, and a 12 or 14 candle gas is required, we should always maintain a vacuum in the hydraulic mains; but when using a large per centage of rich material along with the caking coal, we should maintain a vacuum in the *retorts*, so as to reduce the gas down to that standard.

When the ordinary dip pipes are used, this vacuum cannot be very well applied in a large retort house, because atmospheric air will be drawn in at all the dip pipes which are out of level, or which are connected to retorts out of action.

By using a large percentage of the rich materials, and these improved dip-pipes, the yields may be increased far beyond those generally obtained.

This apparatus is both simple and efficient, and it has neither valve nor stuffing-box to wear and get out of order.

William Farmer.

111 Broadway, N. Y.

Chemical Repertory.
No. 129.—March 16, 1875.
EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

1374. Adulteration of Beeswax.—A. W. Miller, Ph. D., has examined some samples of "refined beeswax," and found it adulterated with paraffine, one part wax to four parts paraffine By heating 100 grains of the mixture with one ounce of oil of vitriol to 350° F., for twenty minutes, the wax is carbonized, and the paraffine not affected. Water is then added, and the carbon separated from the paraffine by repeated melting.—*Am. Jour. Pharm.*

1375. Crayons for Drawing on Glass.—Melt together equal quantities of asphaltum and yellow wax; add lampblack, and pour the mixture into moulds for crayons. The glass should be well wiped with leather, and in drawing be careful not to soil the glass with the fingers. In trimming these crayons, the point may easily be rendered very fine.

1376. Spontaneous Combustibility of Charcoal.—Andrew F. Hargreaves says: That charcoal absorbs its maximum amount of oxygen from the atmosphere within three days after carbonization, and that after that time no danger need be apprehended in using it, while up to that time its use may be attended with danger.—*Jour. Chem. Soc.*

1377. Tunnel under St. Bernard.—Another tunnel under the Alps is proposed; it will pass under the St. Bernard, and be 20,000 feet length. The novel feature of this undertaking is that under the summit the tunnel will be widened out to make a station, and a shaft will be cut, up which passengers can be taken to a hotel on the top of the mountain.

1378. Cooling Apparatus for Liquids.—The following apparatus for cooling wine, water, milk, beer, etc., has been patented in Vienna, and is claimed to be most efficient and convenient, and at the same time among the cheapest. It consists simply of a tube, most conveniently of tin, with a tight-fitting cover, which is rapidly packed, by aid of a wooden stamper, with pounded ice and salt, either mixed or in alternate layers, and is to be plunged into the liquid that is to be kept cool.

1379. Darwinism.—There is one objection to Darwinism, says a late writer, to which little, if any attention has been given:

For example, the nearest creatures to man in form are not the nearest in intellect. The elephant, and dog and horse, which have no affinity to man, have a far closer intellectual affinity than those pets of Darwinism, the gorilla and chimpanzee. Again, man is omniverous—the stronger races of men, from the Greeks before Troy to the English of to-day, are primarily carnivorous. But no monkeys are carniverous. If a man is to be developed from a lower creature, he is nearer to the monkey in form, but to his faithful friend the dog in mind.

1380. Quite Possible.—A Frenchman has just invented a simple little apparatus which will probably sweep away ere long the match trade. It is called the electrical tinder-box, and is small enough to be carried in a cigar-case. On opening this box you see a platinum wire stretched across. Touching a spring, the wire reddens sufficiently to light a cigar. At will you can introduce into a tiny sconce a mesh of cotton steeped in spirits of wine or petroleum, which, taking fire, does service as a *veilleuse*, or nurse's lamp. The hidden agency which heats the wire is a very small voltaic battery, set in action by the touching of the spring.

1381. Arsenic in Coal-Tar Colors.—Dr. Spring muehl, the editor of the *Musterzeitung*, states that out of 25 specimens of magenta only one was found free from arsenic. In 14 the amount was sufficient for quantitative determination. In four samples the proportions were respectively 6·5, 5·9, 5·9 and 5·1 per cent. Such qualities, of course, must prove dangerous if used for coloring liquors, confectionery and toys. In dyeing, however, the amonut of the poisonous matter which attaches itself to the wool is relatively trifling.—*Manf's Record.*

1382. Early Use of Coal.—A contemporary says: Coal is not, as is generally imagined, a modern form of fuel. The Chinese, forerunners in most discoveries, knew its value centuries ago. It is known to have been in use in the days of Julius Cæsar and the Roman Empire, and from the twelfth century to the present day the trade in coal has undergone progressive development. As long ago as Edward the Sixth's reign, toward the middle of the sixteenth century, coal was shipped from England to France. A letter of that date speaks of "that thinge that France can lyve no more without, than the fyshe without water; that is to say, Newcastele coles; which without that they can nother make steel worke nor metail worke, nor wyre worke, nor goldsmythe worke, nor gonnes, nor no manner of things that passeth the fier."

1383 Inversion of Images on the Retina.—It is a well established fact that the image of every object is inverted on the retina of the oye. How is it, then that we see every object right side up? The common explanation in works on optics is that we correct it by habit, that is, that we know that the image of the object is inverted; but by an exercise of the judgment or imagination we correct it. This seems to me to be irrational and unsatisfactory, and I set myself to the task of finding a better solution. In studying the anatomy of the eye, I found that the optic nerves, which spread over the retina of the eye on which images and impressions are made, converge or are collected into a bundle, and cross each other (at the back of the retina, on their way to the brain or sensorium), about as far from the retina as the pupil is.—W. S. Turner, of Napa, California, in *Sci. Am.*

1384. The Blueness of the Firmament.—The balloon ascent of MM. Croce Spinelli and Sivel yielded many facts of interest. Among these we may mention the following:

The elevation reached was 20,700 feet. They found that the temperature steadily diminished, except when passing through clouds. and finally reached 22°C. At 11,800 feet, crystals of ice were visible floating between them and glistening in the sunshine. The lines in the solar spectrum, indicating the presence of vapor of water, disappeared when they reached the greatest altitude, thus proving that this vapor belongs to our atmosphere, and not to the sun. At 13,100 feet sensations of discomfort were removed by the respiration of a mixture of 40 parts of oxygen and 60 of nitrogen. At 15,700 feet the oxygen was increased 75 per cent., and in each instance the physical and mental weakness was restored, and the sky, which previously of a dark hue, again became blue. M. Croce Spinelli has thus removed an old error, and has demonstrated that the blackness of the firmament observed at great heights is due solely to the effects of fatigue on the nervous system.

1385. British Patent.—Self-igniting and inextinguishable danger signal lights for marine and other purposes.—Nathaniel John Holmes, April 17, 1874.—No. 1324.—These improvements relate to an improved mode of constructing life buoy or danger signal lights when phosphuretted hydrogen gas or phosphuret of calcium is employed. In one of these improvements I make use of a compound chamber, one chamber being for the reception of the phosphuret of calcium, the other chamber as an air-chamber to give buoyancy to the rescue signal when placed in water. The openings at the top and bottom of the rescue signal for the emission of the flame and ingress of the water are closed by metal strips soldered on, which can be removed by tension when the signal is required for use; or in the place of the metallic strips metallic capsules may be employed, through which a plug or button is drawn by tension, to form the necessary orifices for the flame and water when the rescue signal is required for use. In another improvement I employ a compound chamber, each chamber being fitted with the necessary parts to produce the light. This compound rescue light is employed when great power of flame is required. In another improvement the rescue signal light is constructed so as to be fired as a shell from a mortar or bomb, either with or without attachment to the rocket line apparatus.

1386. American Trade-Ethics.—The London *Mining Journal* says, doubtless with much justice:

The great difficulty which, as it appears to us, always cripples the operations of the Americans is their reckless disregard of the laws of credit. This disregard has cauied a suspicion of almost every American enterprise among the capitalists of European countries The ordinary Englishman shrugs his shoulders in most cases when an American venture is proposed to him. It is useless to argue that there are some honest Americans, and that the bad should not be confounded with the good. Good and bad alike share the same fate, and the nation suffers in consequence want of confidence, want of credit, and want of capital. Even Americans cannot trust Americans, and the Southern and Western States are not developed as they might be. Instead of matters growing better, they seem to be becoming worse; the democracy of the United States, while willing to enjoy the benefits of capital, are unwilling to concede its legitimate remuneration. Even Americans seem likely to exclaim not so much "protection for native industry," as "protection for native capital."

1387. Cost of Sanitary Works.—The British Government is seeking by widespread inquiries to ascertain the estimated cost of all the sanitary structural works undertaken throughout England and Wales during the past year. The result, if fully returned, will certainly show an enormous figure. The authorities are not asked for their year's outlay upon structural works, but the ultimate cost as estimated of the completed works. At the close of the local tax year, 1872-3, the urban sanitary authorities alone were in debt for borrowed money upwards of £18,000,000, exclusive of loans raised by some of our large borough towns for meeting the requirements of the public health. The returns now asked for will show the separate estimate under each authority for sewerage works, water supply, paving, and street improvements, discriminating under the latter head public from private works, the cost of markets, hospitals, etc. At the same time, the history of nuisances during 1874 is to be set forth by the sanitary authorities categorically; *e. g.*, the number of nuisances reported, the number abated without formal notices, the number after formal notice but where no proceedings were taken, the number of nuisances abated after proceedings, and the total number abated from all causes in each sanitary district.—*Iron.*

Nitrite of Amyle.—This ether has within these last few years obtained a remarkable importance owing to its extraordinary action upon the body. A distinguished chemist, Professor Guthrie, while distilling over nitrite of amyle from amylic alcohol, observed that the vapor, when inhaled, quickened his circulation, and made him feel as if he had been running. There was flushing of the face, rapid action of the heart, and breathlessness. In 1861-2, I made a careful and prolonged study of the action of this singular body, and discovered that it produced its effect by causing an extreme relaxation, first, of the blood vessels, and afterwards of the muscular fibres

of the body. To such an extent did this agent thus relax, I found it would even overcome the tetanic spasm produced by strychnia, and having thus discovered its action, I ventured to propose its use for removing the spasm in some of the extremest spasmodic diseases. The results have more than justified my expectations. Under the influence of this agent, one of the most agonising of known human maladies, called *Angina pectoris*, has been brought under such control that the paroxysms have been regularly prevented, and in one instance, at least, altogether removed. Even tetanus, or lockjaw has been subdued by it, and in two instances, of an extreme kind, so effectively as to warrant the credit of what may be truly called a cure.—*Dr. Richardson, before the Society of Arts.*

1389. Consumption of Wood by Railways.—The *National Car Builder* reports that at the close of 1873 there were 71.574·9 miles of main lines and 13,512 miles of sidings and double tracks making 95,977·9 miles of railway within the United States. Upon these roads the larger proportion of the locomotives consumed wood for their fuel. The number of ties used varies from 2,200 to 2,800 per mile. Taking 2,500 as the mean, it appears that 212,602,500 pieces of timber eight feet long and from six to eight inches between the upper and lower surfaces, are required to supply this single item. The durability of ties varies, with climate, kind of timbers, soil and usage, from four to ten years. Assuming six years as the average life of a tie, the amount required for annual supply must be 32,488,750 pieces, or 94,530,000 cubic feet. In considering this item it must be remembered that a large amount of waste occurs from hewing and other causes. It must also be borne in mind that the demand for timber by railroads, besides ties, and fuel, is enormous, including fencing, bridges, buildings and other structures in great variety and number; that the risk from fires is exceptionally great, and that our requirements in this direction are increasing even more rapidly than our supplies are wasting away.

New England Association of Gas Engineers.

The annual meeting of the New England Association of Gas Engineers was held at the Tremont House, in the city of Boston, February 11, 1875.

There were present at the opening of the meeting about forty members.

The President, W. W. Greenough, Esq., having taken the chair and called the meeting to order, the secretary read the record of the proceedings of the semi-annual meeting of the association held in New Haven in the month of August last, which was approved.

The treasurer then presented and read his annual financial report, which was referred to Messrs. F. C. Sherman and B. G. Raymond as a committee to audit the same. Having attended to that duty, they subsequently reported that the accounts of the treasurer were correct.

Their report, with the report of the treasurer was accepted and ordered to be placed on file. It was voted that Messrs. W. H. White, of the Citizens Gas Light Company of Brooklyn; Frederick S. Benson of the Nassau Gas-Light Company of Brooklyn; John Balmore, of the Harlem Gas-Light Company of New York; and James Beggs, of the San Francisco Gas-Light Company, California; engineers of their respective companies, being in the city, be invited to be present and take part in the discussions.

The same invitation was extended to Messrs. Charles Nettleton, of New York, Secretary of the American Gas-Light Association; I. N. Stanley, of Brooklyn, Consulting Gas Engineer; W. W. Goodwin, of Philadelphia, and William Whittaker of Providence.

Mr. S. G. Stiness was appointed by the chair a committee to wait upon the gentlemen above named, and inform them of the vote of the association. Having discharged that duty, he introduced them to the members, after which they took their seats and participated in the discussions which ensued.

The secretary then presented to the meeting the names of the following persons, proposed by the Board of Directors for membership:

John T. Baylies, of Malden and Melrose Gas-Light Company, Mass.

Charles F. Smith, of Marlboro Gas-Light Company. Mass.

Dudley T. Tilton, of Newburyport Gas-Light Company, Mass.

David Brayton, of Brocton Gas-Light Company, Mass.

Lucius D. Rhoades, of Holyoke Gas Company. Mass.

Edward Gustine, of Keene Gas-Light Company, New Hampshire.

William Badger, of Concord Gas-Light Company, New Hampshire.

A member also presented the name of George L. Manchester, of East Hampton Gas-Light Company, Mass.

A vote having been taken, the persons nominated were duly elected members of the association.

Messrs. Smith, Brayton, Tilton, Rhoades and Manchester being informed of their election, took their seats as members.

Voted—To proceed to the election of officers for the ensuing year.

Voted—That a Nominating Committee of Five, be appointed by the chair, to present a list of names to be ballotted upon.

The chair appointed as that committee Messrs. George Dwight, B. G. Raymond, Charles F. Warren, T. Metlar Cox and William Stedman.

Mr. Greenough being questioned as to his willingness to serve as president for another year, if re-elected, replied that he still adhered to the decision so firmly expressed by him at the last annual meeting, when elected to that position for the fourth time, not to again accept the office. He therefore respectfully declined to be considered a candidate for that office, or for any other in the gift of the association. He alluded to the practice of the British Gas-Light Associations, not to require any one who has served as president, to act for them in any official capacity, which practice he considered a wise one, and worthy of imitation on the part of kindred associations.

The committee having retired for consultation, the secretary read letters from Mr. George W. Edge, who had been invited by him to be present, and from Mr. S. P. Harbison, a member of the association, regretting their inability to attend the meeting, and expressing their wish that the present occasion might be both pleasant and profitable.

A telegram to the same effect was also received from Mr. E S. Cathels, Engineer and Manager of the Montreal Gas-Light Company, Canada.

Voted—That the above communications be received and placed on file.

The committee appointed to nominate a list of officers for the ensuing year, reported as follows:

For President—George D. Cabot, of Lawrence Gas-Light Company, Mass.

For Vice-Presidents—O. E. Cushing, Lowell Gas-Light Company, Mass.; S. G. Stiness, Pawtucket Gas-Light Company, R. I.

For Directors—John M. Hill, Concord Gas-Light Company' N. H.; T. Metlar Cox, New Haven Gas-Light Company, Conn.; William A; Stedman, Newport Gas-Light Company, R. I.; F. C. Sherman, Worcester Gas-Light Company, Mass.; W. C Perry, Bangor Gas-Light Company, Md.

For Secretary and Treasurer—George B. Neal, Charlestown Gas-Light Company, Mass.

A ballot having been taken, and the persons nominated by the committee having received all the votes cast, they were declared duly elected.

The president appointed Messrs. Dwight and Gerould a committee to wait upon the newly elected president to the chair.

Mr. Cabot, upon taking the chair, made a few remarks, accepting the office, and thanking the members for the honor thus unexpectedly conferred upon him, and assuring them that while he occupied the position of president of the association, he should endeavor to the best of his ability, to discharge the duties of the office in a manner satisfactory to them, and for the best interests of the association.

Mr. Greenough, upon retiring from the office of president, which he had held for four consecutive years, commencing with the date of the organization of the association, made a short address, which he began by expressing his appreciation of the honor conferred upon him by the association, in electing him four times consecutively to the responsible office of president. It was his hope that the principles upon which the association was founded, would be adhered to strictly in the future; that it would keep itself untouched and unsullied by any purposes of private interest or gain, and that its members will, if they "try all things," only "hold fast that which is good." As there is no royal road to learning, so there is no royal road to gas making. No power will give as good results from the poorest materials as from the best; no large extension of product can be made without diminution of value. So far as is known the same rules apply in our specialty as in other processes of manufacture, that, to reach the richest results the best material must be used, in the best way known to science or art.

While disclaiming the opinion, that from the rich products which nature has afforded so liberally, there may not, in the future, be discovered both matter and process, which will better suffice than those now in use, for general illuminating purposes, yet he would counsel the members of the association, that in the multitude of schemes and visionary projects which underlie the path of the gas engineer, too much care cannot be taken to prevent deception and imposition. So much duplicity and exaggeration are often practised by many claiming to possess valuable patent gas processes, that we are inclined to look upon all new inventions in that direction as worthless; in fact, we are sometimes disposed to believe that the truth is a lost art, so far as relates to the assertions and claims of such persons.

Mr. Greenough concluded his address as follows:

Wishing the association a long and prosperous career of usefulness in the future, and with my personal good wishes to each individual member, I now respectfully take my leave of the chair, to which I warmly welcome my successor.

At the close of the remarks of the retiring president, which were received with much favor, it was voted that the thanks of the association be tendered to our late president, for the able and satisfactory manner in which he has discharged the duties of his office during the past four years.

Voted—That he be requested, if agreeable to him, to furnish a copy of his address to the secretary, so that the same may be entered in full upon the records.

The consideration of the proposed amendment of the second section of the Articles of Agreement was taken up, when, after a brief discussion, it was voted that it be amended so as to read as follows: "The annual meeting of the association shall be held on the third Wednesday of February in each year, at such hour and place as the directors shall determine."

Mr. John M. Hill, for the committee appointed at the last annual meeting to consider and report upon the proposed amendment of the fourth section of the Articles of Agreement, so that gas engineers from other parts of the United States than New England, and from Canada, may be admitted as associate members or otherwise, reported an amendment to read as follows:

"Any gas engineer, residing out of the New England States, may be elected an associate member, and be admitted to all the privileges and amenities of this association, but shall not be entitled to vote or be eligible to office or liable to assessment.

"Any gas engineer, eminent in his profession, may

be elected an hon rary member in form and manner as prescribed for the election of regular members."

The report of the committee was accepted, but after considerable debate their recommendation was not adopted, and it was voted to indefinitely postpone further consideration of the subject.

Mr. Hill offered the following resolution, which was passed unanimously:

"*Resolved*, That the thanks of this association be tendered to the management of the Boston Gas-Light Company, for the pamphlet publications of the phonographic report of the hearings and of the proceedings in the Board of Aldermen of the city of Boston, on the petition of the Citizens Gas Light Company."

Voted—That a committee of two be appointed by the chair, to make selection of a suitable place for holding the next semi-annual meeting, to report the same to the meeting for its decision.

The chair appointed as that committee Messrs. Stiness, Dwight and Gerould.

[To be concluded.]

The Oxyhydrogen Blowpipe of Dr. Hare—1802.

[From the Address of Prof. B. SILLIMAN before the Chemical Centennial Gathering at Northumberland, Pa., August 1, 1874; entitled "An Essay on American Contributions to Chemistry."

[Concluded from page 82.]

THE LATE ROBERT HARE.

"During the progress of the forty years of our editorial labors, sorrow has often been awakened as we have been called to record the departure from life of friends and fellow-laborers in the common cause.

"Robert Hare, the distinguished chemist and philosopher, who died in Philadelphia on the 15th of last May in the seventy-eighth year of his age, is entitled to a grateful commemoration in this Journal, to whose pages his contributions were for many years more numerous than those of any other correspondent. The enumeration of the titles merely of about one hundred and fifty articles furnished by him occupies five columns of the general index of the first fifty volumes of the Journal. He appears in forty-one of those volumes, and in seven volumes of the second series.

"For more than half a century his name has been familiar to men of science as a chemical philosopher, and to the cultivators of the useful arts throughout the civilized world.

"Dr. Robert Hare was born in Philadelphia, January 17th, 1781. His father was an Englishman, a man of strong mind, and honored in his adopted country by the public confidence. His mother was from a distinguished Philadelphia family. In early life he managed the business of an extensive brewery, which his father had established, but his strong leaning toward physical science very early manifested itself, and soon led him to abandon the pursuits of a manufacturer and devote his talents and fortune to science. Before the age of twenty he gave evidence of this predilection for scientific pursuits by following the course of lectures on chemistry and physical science in his native city, and by uniting himself with the Chemical Society of Philadelphia, then embracing the names of Priestley, Sybert and Woodhouse.

"In 1801 he communicated to this Society a description of the oxyhydrogen blowpipe, which he then called a 'hydrostatic blowpipe.' Prof. Silliman, having been much engaged with him in a series of experiments with this instrument in 1802–3, subsequently distinguished it as the 'compound blowpipe,' having, in fact, on his return from Philadelphia in 1803, constructed for the laboratory of Yale College the first pneumatic trough combining Dr. Hare's invention; an apparatus subsequently figured and described by Dr. Hare in his memoir 'on the fusion of strontia and volatilization of platinum.'* His memoir to the Chemical Society was separately published in 1801, and was republished in *Tilloch's Philosophical Magazine*, London, 1802, and also in the *Annales de Chimie* (1st series), v. 45.

"This apparatus was the earliest and perhaps the most remarkable of his original contributions to science. It was certainly evidence of a highly philosophical mind, that Dr. Hare, in that comparatively early period in modern chemistry, and when the received notions of the true nature of combustion were so vague, not to say erroneous, should have had the acumen to conceive that a stream of oxygen and hydrogen burning together should produce so intense a heat. Lavoisier, certainly one of the most acute of chemical philosophers, and unsurpassed in his skill as an experimentalist, had beaten up the same path so far as to direct a jet of oxygen upon charcoal, and he thus produced a degree of heat by which he fused alumina and other bodies before deemed infusible. He had even brought the elements of water into the same vessel, and had there burned them from separate jets, in his famous apparatus for the recomposition of water. But it seems never to have occurred to him that here was a source of heat greater than any then known. In our view, Dr. Hare's merit as a scientific philosopher is more clearly established upon this discovery than upon any other of the numerous contributions he has made to science. His original experiments were repeated in 1802–3 in presence of Dr. Priestley, the discoverer of oxygen, then on a visit to Philadelphia, and of Silliman, Woodhouse, and others. They were subsequently greatly extended by Prof. Silliman, who, with the apparatus already alluded to, subjected a great number of refractory bodies to the action of the oxyhydrogen jet and published an account of his results in the Memoirs of the Connecticut Academy, May 7th, 1812.

"The discovery of the oxyhydrogen blowpipe was crowned by the Amer. Acad. at Boston by the Rumford medal."

"The historian of science will, in view of the facts here quoted, find it needless to notice the disingenuous effort of Dr. Clarke of Cambridge, England, in his '*gas blowpipe*,' to overlook or appropriate the discovery of Dr. Hare, and the researches of Silliman and others, several years after (in 1819) this discovery had been fully before the scientific world—an effect which must ever remain as a sad stain upon the reputation of this otherwise distinguished man.*

"It is not our purpose here to rehearse the history of Dr. Hare's discovery in full, much less to describe all the modifications which the apparatus has received at the hands of its original discoverer and others. It is well known that in later years he constructed the apparatus on a gigantic scale, with large vessels, of wrought iron capable of sustaining the pressure of the Fairmount water-works, and that with this powerful combination he was able to fuse at one operation nearly two pounds of platinum.† In these experiments the metal is held upon a refractory firebrick, and both are heated as highly as possible in a wind furnace before submitting it to the gas-jet. The product of this fusion from the crude grains is found to be greatly purified, a result probably due to the volatilization at this intense heat of some of the associate metals.

"The employment of Dr. Hare's jet to illuminate lighthouses and signal reflectors under the names of Drummond light and Calcium light, is only another example of the mode of ignoring the name of the real discover, of which the history of science presents so many parallels.

"The fertility of Dr. Hare's inventive mind is illustrated by the numerous and ingenious forms of apparatus which he contrived for research or illustration. To many of these he was led by the necessity of preparing the illustrations for his lectures upon a scale of magnificence adequate to the instruction of the large classes of the medical school of the University of Pennsylvania. He was called to the Chair of Chemistry in that institution in 1818, and continued in the discharge of its duties for nearly a third of a century and until his resignation in 1847.

"He was fond of graphic illustrations; they abound in his memoirs and in his Compendium and other works, and aided by his lucid descriptions his inventions thus become quite intelligible. Where most instructors are satisfied with less perfect and more simple means and explanations, he seemed to be content with nothing short of perfection.

"During his long course of research and experimenting, he accumulated a vast store of instruments and materials. An inspection of his repositories and the treasures there accumulated filled the observer with astonishment, and in his lecture room there was always a profusion of apparatus, often instruments of great dimensions, corresponding well with his large mind, with his great physical and intellectual power, and unquenchable ardor. He was himself an able and skiiful mechanic, and often worked adroitly at the turning lathe and with other resources of a well-furnished shop. In his operations he spared neither labor nor expense, and bestowed both munificently for the accomplishment of his objects.

"He devoted great labor and skill to the construction of new and improved forms of the voltaic pile, and it is easy to show that owing to his zeal and skill in this department of chemical physics, American chemists were enabled to employ with distinguished success the intense powers of extended series of voltaic couples long in advance of the general use of similar combinations in Europe.

"It was with one of Hare's deflagrators that Silliman in 1823 first demonstrated the volatilization and fusion of carbon, a result considered so extraordinary at the time that it was long received with incredulity. Since the general introduction of Bunsen's battery, these effects are no longer doubted; all of Professor Silliman's results having been confirmed and extended by Despretz, De La Rive, and others.

"The deflagrator was invented in 1820.* Four years earlier Dr. Hare had contrived another instrument which he called the calorimotor. In this instrument great extent of surface was obtained from the combining of many large plates (18″ or 24″ square) of zinc and copper into two series, and plunging the whole at one movement into a tank of dilute acid. The magnetic and heating effects of this instrument were surprising, and to this day no other form of voltaic apparatus appears to occasion the movement of so great a volume of heat with so low a projectile or intensitive force. By it, large rods of iron or platinum, when clamped between its jaws, are first fully ignited and fused with splendid phenomena, while at the same time its intensity is so low that hardly the least visible spark can be made to pass by it through poles of carbon.

"In the philosophy of chemistry, Dr. Hare has distinguished himself for the zeal and logical acumen with which he combated what he conceived to be the errorrs of the salt radical theory. He was ready at all times to engage in controversy upon any point of theory where he conceived there was an error latent. No one can review the numerous letters which he has addressed to the senior editor of this Journal, to Berzelius, to Liebig and to Farsday, and published in this Journal without perceiving that he was no ordinary antagonist.

"In his family and among his friends Dr. Hare was very kind, and his feelings were generous, amiable and genial, although occasionally his manner was abrupt—from absence of mind occasioned by his

* Trans. Am. Phil. Soc., vol. vi., p. 99, and plate 3 (June 17, 1803).

* The reader will peruse with interest, in this connection, Dr. Hare's elaborate defence of his own claims and those of his associate, Prof. Silliman, against Dr. Clarke's appropriations, in this Journal [1], vol. ii. pp. 281–302, 1820. Dr. Clarke, after a full and spirited protest had been communicated to him, stating fully Dr. Hare's claims and the wrong done him, failed to make any acknowledgement of his error, thus exonerating us from the force of the old maxim, "*Nil de mortuis nisi bonum.*" Dr. Hare heads his strictures on Dr. Clarke's book with the well-known lines of Virgil. "*Hos ego versiculos feci, tulit alter honores*, etc.

† Roberts in New York has lately with Dr. Hare's apparatus succeeded in fusing perfectly 53 oz. of platinum at one operation, and Deville has by the same means more recently fused one hundred and fifty pounds of platinum at one operation, in obtaining the metal for the new standard of measure.

* Silliman's Journal, [1], vol. iii., p. 105.

habitual abstraction and absorption in thought; his mind was ever active, and conversation would sometimes seem to awaken him from an intellectual reverie. He had high colloquial powers, but to give ull effect, it was necessary that they should be roused by a great and interesting subject, and especially if it assumed an antagonistic form. He would then discourse with commanding ability, and his hearers were generally as willing to listen as he was to speak.

"He was a man of unbending rectitude, and a faithful friend both in prosperity and adversity.

"His frame was robust—powerful and ample in structure, and of strong muscular development, having been invigorated in earlier years by skilful training; and, had there been occasion, he would have made a formidable physical antagonist. His head was large and of noble model; no stranger could meet him without being impressed by a figure of such grandeur and a head and features so remarkable.

"Dr. Hare was an ardent patriot, who loved his country and cherished its institutions not for office or emolument, which he never sought or received, but from pure and lofty motives. He was of the school of Washington—an enthusiastic admirer of that great man—a federalist, while ;tha primeval party had a name and retained vitality—and when it passed by an imperceptible transition into another form, he was found among the whigs. He occasionally wrote upon the great political and financial questions which agitate the public mind. These discussions, like all his writings, were always marked by vigorous thought, large views, and elevated patriotism.

He was not, however, so exclusively a man of science as to ignore the charms of literature. His particular friends know that his philosophy was sometimes softened by listening to the Muses, and he occasionally indulged in poetical composition.

"Dr. Hare was one of the few life members of the Smithsonian Institution, to which he gave soon after he resigned his professorship, all his chemical and physical apparatus, which has thus become the property of the nation"

Gas Items.

Washington, D. C.—The press of the nat na capital is still "down on" the gas. Even the pe - lamplighters do not escape. Witness an item rom the *Chronicle*:

"The street lamps are always lighted on a moonlight night. The failure to light up on dark and stormy nights is because umbrellas have not been furnished the lamplighters."

—On Monday afternoon, March 8, at half-past two o'clock, loud and heavy noises in the northwest wing of the Capitol startled those in the vicinity, occasioning much alarm, some supposing that the elevator had fallen, and others that the steam boiler used for ventilating purposes had burst. Crowds rushed to the first floor to learn the cause of the alarm, and Senators mingled in the excited throng. A clerk who hastily repaired to the firemen's department, breathlessly returned reporting there was no damage to anything or anybody there, nor had the elevator broken from its fastenings. It was soon discovered that a gaspipe had exploded, tearing through the thick ceiling of the basement and lifting the heavy flooring to a height of a foot along the line of the pipe, and scattering fragments in every direction. The excitement soon subsided, and the workmen immediately commenced stopping the extensive leakage of gas.

Gas from dead corpses, human excrements, garbage, and similar delightful sources, is every now and then *going to be* introduced, and to do wonders. The *Scientific American* still sticks to this business, and has an account of gas from "sewer refuse" recently introduced, as it says, into Breslau, Silesia, by Mr. Alfred Sendermann. It thinks that "several important sanitary problems will be solved by the invention." Let us have a Joint Stock Company, by all means.

Frozen Meters.—In our last we referred to the use in Paterson, of alcohol, to thaw out frozen pipes and mains. The London *Journal of Gas-Lighting* tells us of a like device as used in a northern British town and found very successful, which was to pour into frozen meters a little "methylated spirit" (mainly alcohol):

"They had several hundred meters frozen every day while the frost lasted, and in a majority of cases they found this an effectual remedy. A few gallons of the spirit were obtained, and filled into phials. One of these was given to each man on going to attend to the complaints. Of course, where the meter was completely frozen solid, it would not be so effectual; but with meters in daily use this was seldom the case."

Gas Wells.—On the question of the necessary exhaustibility, in a few years, of gas wells, which some suppose; it may be stated that there is a gas well on Wolfe creek, about one mile from the turnpike leading from Mercer to Butler county, Pa., which was dug in 1838. This well was dug for salt, and abandoned as a salt well in consequence of a heavy flow of gas. The parties who then owned it came to Pittsburgh and had a large cast-iron cap made to cover the well, with a pipe and valve in one side. By some means they closed the valve and the salt pan and cap bursted, and the works with all the apparatus was blown to pieces. Recently, Mr. Alfred Carnes, of New Castle, has leased the well, and we are informed that he is contemplating the erection of a fine flouring mill upon the premises to be run entirely with gas. It is said that gas has been flowing from this well ever since it was discovered. This information may be of use to those contemplating the utilization of natural gas permanently for manufacturing purposes.

Natural Gas at Chatillon (Haute Savoie), France.—The soil beneath this place is impregnated with carburetted hydrogen gas from some subterranean source, a bore-hole driven to the depth of only one meter yielding a fair supply of gas, which will burn five or six hours. Attempts are being made to utilize it for processes of illumination.

Iron tells us that during the past year, the system of Siemens has been extended in France to heating gas retorts.

A Protested Gas Bill.—The Metropolitan Gas-Light Company sued the city for $190,000 for gas supplied in 1871. A motion was made in Supreme Court, Chambers, on behalf of the city to amend their answer by setting up a tender of $118,000 Judge Lawrence, February 8, granted the motion on condition that simultaneously with the service of the amended answer, the defendants pay into court the amount alleged to have been tendered by them.

The New Jersey Legislature has passed a bill incorporating the "Taxpayers Gas-Light Company," of Jersey City.

It is asserted that the petroleum gas used at Tidioute has not condensed or deteriorated during the extremest cold of th past winter, even in pipes exposed to the open air.

Stealing Gas.—John McGorley, saloon keeper at 1,807 Third avenue, was tried in the Special Sessions on the 9th inst., for stealing gas from the Harlem Gas-Light Company. McGorley's saloon had been paying gas bills of about $20 per month for three years. When the inspector called to examine the meter for February, he found the instrument covered with awnings, bags, and other rubbish. The index registered only enough to amount to $3 for the month. Examination revealed a rubber tube under the meter connecting the index and outlet, furnishing the gas to McGorley's store, without passing through the meter for measurement. The court fined him $20.

New Use of Gas.—An ingenious French gentleman has lately invented an entirely original mode of suicide, with the happiest possible result. Before going out to make his little promenade, he turned on the gas in his apartment, and on his return borrowed a lighted candle from the hotel-porter, armed with which he quickly opened his chamber door, and was instantly blown into another world with much *eclat* and total demolition of the *ameublissement*. The device is not, perhaps, likely to come into fashion with economical persons who own the houses in which they reside, but in the case of hired lodgings it is singularly effective, and possesses numerous and obvious advantages over ordinary methods.

Long Island City, N. Y.—According to those infallible authorities, the newspapers, there is something out of joint here. They state that "The poor quality of gas at present furnished to the residents, and the frequent occurrence of the gas giving out before 9 o'clock, P. M., have led some of the citizens to form a company and apply for a charter. The streets in the city at present remain nightly unlighted.

Gas from Refuse Lime Soap.—In the woolen mills of Europe the refuse scouring and fulling liquors are conducted into reservoirs, and precipitated with lime. The insoluble lime soap thus precipitated is allowed to settle, and the supernatant liquid run into the stream. The lime soap, after being pressed and dried, forms an excellent material for the manufacture of illuminating gas, the retorts being somewhat smaller than when coal is used. The gas thus obtained is much cheaper, and has a much greater illuminating power than that made from coal, and many mills are illuminated entirely by the gas derived from their own refuse liquors. Recent expertments, carefully conducted, have shown that equal weights of lime soap and best gas coal being taken, the former yielded 1.61 parts of gas to 1 of the latter, and that the intensity of the light obtained from the lime soap gas was 3.50 times as great as that of the coal gas.—*Manufacturers Record.*

Conveying gas by a steam blast or jet is no new thing. There is one case in which it is of special applicability; where gas is to be forced down to a lower level, as in a mine, for example. From an English exchange we learn that "work is being done in connection with the lighting of collieries by Messrs. Huntriss' patent steam-gas jet, which promises to come into very general use Messrs. Hutchison Brothers, of Barnsley, are just now engaged in fixing the apparatus with a view of lighting up the bottom of the shafts of the Annesley Colliery, near Nottingham, and the Cannock Colliery at Rugeley, South Stafford shire. The shafts of the former colliery are 500 yards deep, and those of the latter about 380.

Iron says that Mr. S. Warren, of New York, has patented a gas beater and condenser, which is to be placed between the exhauster and the purifier of a gas-making mechanism, for beating or scrubbing the gas, and condensing from it the tar and ammonia. While the gas is passing through the central compartment of a drum, cold, tepid, or warm water or air may be forced through the end compartments and small connecting pipes, to regulate the temperature of the gas as it passes to the purifier.

The New York *Tribune* clamors for the abolition of telegraph poles; which has interest for urban gas companies, as, when accomplished, it will, in all probability, send the wires under ground. On this subject the *Graphic* says:

"In the city of London proper the telegraph wires are laid underground, while in the rest of London they are carried over the tops of the houses. Either plan does away with the ugly poles which have grown to be such a nuisance in our streets. Of course the frequent disturbance of the ground necessitated by work on sewers, gas-pipes, and water-pipes may be pleaded as an objection to forcing the companies to lay their wires under ground, but this objection cannot be made to the plan of carrying them on short poles erected on the tops of buildings. At any rate

so long as the telegraph poles are in use the companies ought properly to be made to pay the city something by way of rent for the real estate thus occupied."

Water-Supply Items.

PEEKSKILL, N. Y.—At a meeting of the Board of Water Commissioners of Peekskill, Feb. 23, a contract was awarded to Messrs. Fairchild & Walker, of that village, for the construction of a reservoir in Campfield Woods for the proposed new water-works. There will be about 50,000 yards of earth excavation and 100 yards of rock excavation. The work is to be completed by 1st of July next.

The estimated cost of the proposed water-works for Peekskill, including land purchased for reservoir, pumps, and hydrants, pumping machinery, engineer's salary, counsel fees, etc., will amount to $120,000, being $30,000 less than the sum the Commissioners were authorized to expend in the matter.

ANCIENT AQUEDUCTS.—M. Belgrand, whose services to Paris, as director of the water service of the city cannot be overrated, has made a communication to the Academy of Sciences, from a book he is about to publish on "Ancient Aqueducts," in Egypt and Greece. He showed that Egypt never could have had aqueducts, but that her system of irrigation is of the highest antiquity, and still excites the admiration of engineers. With all the engineering art at present existing, says M. Belgrand, it would be difficult to construct covered aqueducts, as the lowest practical fall, namely, 0·10 in 1000 cannot be obtained. The ancients never made aqueducts with a fall of less than 0·50 per 1000 feet, and no trace of a covered conduit is found in Egypt or in Nubia. Greece was certainly supplied by aqueducts, as their gymnasium supplied the Romans with the type for the Thermes; but the aqueducts of the former were much less important than those of the latter. M. Belgrand intends to complete the history of the aqueducts of the ancient world, and also of those of modern times, down to that of the derivation of the Vanne, which is now approaching completion, and the waters of which will entirely supersede the less wholesome water of the Seine. These scientific histories will form a mass of valuable information, and save water engineers a vast deal of trouble.—*Iron.*

THE NEW BROOKLYN RESERVOIR.—At a meeting of the Aldermen recently, the Water and Drainage Committee reported that they could recommend nothing in relation to the new reservoir, the Corporation Counsel having advised that it would not be safe for them to go forward under the law as it stands. The committee requested that an amendatory act be procured, and the Corporation Counsel was directed to prepare the act.

ABORIGINAL INGENUITY.—The native African has a curious method of obtaining water passing through great deserts. The operation is described by Livingstone as follows: "The women tie a bunch of grass to one end of a reed about two feet long, and insert it in a hole dug as deep as the arm will reach, then press down the wet sand around it. Applying the mouth to the free end of the reed, they form a vacuum to the grass beneath, in which the water collects, and in a short time it rises to the mouth."

VERY GOOD.—Mr. Culyer, chief engineer of Prospect Park, Brooklyn, has published a plan for preventing the freezing of hydrants and otherwise increasing their efficiency. It is proposed to lower the hydrants below the surface of the sidewalk, inclosing them with a chamber of either brick or iron. From the bottom of this chamber a pipe leads to the sewer to carry off any water that may escape during use, and the upper part of the hydrant is encircled by a branch pipe from the gas-main with numerous perforations, so that in case of necessity a ring of gas jets may be lighted to thaw out any obstruction by ice. The scheme, which is illustrated by a diagram, seems to us to be an easily practicable one, and worthy the attention of the municipal authorities.

SINGULAR FATALITY IN A LONDON WATER-MAIN.—The Grand Junction Water-Works Company have been laying down a new 26-inch main between Hampton and Twickenham. Peter Wood, aged 17, whose duty it was to sweep out the pipes, crawled up them for that purpose, accompanied by the nephew of the foreman, Charles Hunt. As they did not return, two other lads went up the pipe without finding them, and became overpowered with foul air. The pipe was broken into about a quarter of a mile from where the lads went in; Wood and Hunt were discovered apparently dead, but Hunt was restored to consciousness; the other lad was found to be dead.—*London Journal of Gas-Lighting.*

[What is the origin of irrespirable air in a water-main. This is an important question.—ED.]

The water supply of London, during 1874, was something like forty-five thousand millions of gallons. The daily quantities in each month of the year were as follows:

1874.	Gallons per diem.	Houses supplied.	Gallons per head per diem.
January.....	109,118,500	508,329	22·5
February....	109,013,458	508,465	32·5
March.....	109,514,116	508,818	32·6
April.....	112,124,179	509,017	33·4
May.....	121,281,889	510,033	35·7
June.....	125,689,091	510,409	36·9
July.....	127,668,248	512,203	37·5
August.....	127,649,728	512,540	37·5
September..	120,871,501	512,825	35·5
October.....	116,336,586	573,520	34·2
November...	111,217,252	613,712	32·7
December...	106,947,278	514,118	31·4
Yearly av'ge	116,451,402	511,178	34·3

About sixty millions of gallons were derived daily from the Thames, about thirty-nine millions from the Lea, and the rest from deep wells in the chalk, and about 80 per cent. of the daily supply was used for domestic purposes.

JERSEY CITY, N. J.—From the *Scientific American* we learn the following interesting particulars:

"The new distributing reservoir, now in process of construction under the supervision of Mr. John P. Culver, Chief Engineer of the Jersey City Water Works, is located on the summit of the hill and between the positions of the horse car elevator and the new Delaware, Lackawanna, and Western tunnel. For many years past the Bergen reservoir, a small structure holding only a three or four days' supply for the city, has served the purpose of a distributor; but the increasing population has necessitated the present building, of larger accommodations. Work was commenced on the new reservoir in 1870, and will, it is expected, be completed so that a portion of the reservoir can be used during the coming fall. The area of the structure is 27 acres, or 700 feet wide by 1,700 feet long. Its capacity will be 23,000,000 gallons, this being a supply for twenty-three days. The depth of water will be 25 feet. The receptacle is divided into two portions, either or both of which may be drawn upon at will, and is surrounded by a heavy stone wall and puddle bank, the former 18 feet in height. The cost, up to the present time, is said to be half a million dollars. The means of supplying this reservoir consists in a huge siphon 30,075 feet long, which joins it with the reservoir at Belleville. The siphon has a fall of 29 feet, and is composed of three separate pipes resting upon a trestlework bed, which is constructed over the meadows. The oldest pipe is twenty inches and the others, which have been placed quite recently, are thirty-six inches in diameter. One of the latter is of cast iron; the other is worthy of special remark, as it is made of 1 8th inch boiler iron, riveted together and covered inside and out with two inches of hydraulic cement."

California, whose history dates back only about 25 years, promises soon to take her place as one of the greatest States in the Union. Her population in 1850 was only 92,000, but since that time it has increased more than 700 per cent., or at the rate of about 30 per cent. each year.

Ancient Anaesthetic Agents.

Dioscorides, one of the fathers of medicine, and particularly of that part which pertains to the use of curative substances, or medicaments proper, is full of descriptions of vinous tinctures, some of which were sufficiently potent even for our present use. On the table before us is a vinous tincture of this kind, which has a very singular and, I had almost said, a romantic history. This is the wine of Mandragora. In the isles of Greece there has grown for ages a plant called mandrake; it belongs to the same family of plants as our belladonna, or deadly nightshade. From the root of this plant the Greeks extracted, by means of wine, a narcotic, and what in this day we should call an anæsthetic. Some, says our learned Discorides, boil the root in wine down to a third part and preserve the decoction, of which they administer a cyathus, about what would now be a common wine-glassful, for want of sleep, or for severe pains of any part, and also before operations with the knife or cautery, that these may not be felt. Again, he says, a wine is prepared from the bark without boiling, and three pounds of it are put into a cadus (about 18 gallons) of sweet wine, and three cyathi of this are given to those who are cut or cauterised, when, being thrown into a deep sleep, they do not feel any pain. Again he speaks of a preparation of mandragora called morion, which causes infatuation and takes away the reason. Under the influence of this agent the person sleeps, without sense, in the attitude in which he took it, for three or four hours afterwards. Pliny, the Roman historian, much later, bears evidence to the same effect, and adds the singular remark that some persons have sought sleep from the smell of this medicine. And again, Lucius Apuleius, the author of the book called the "Golden Ass," who lived about 160 A. D., and of whose works eleven editions were republished in the fourteenth and fifteenth centuries, says that if a man has to have a limb mutilated, sawn, or burnt, he may take half an ounce of mandragora in wine, and whilst he sleeps the member may be cut off without pain or sense.

It is unquestionably to this same anæsthetic wine our own Shakspeare refers in his half-imaginary, half-legendary Middle Age history. This is the wine of that insane root, which, says Macbeth—"takes the reason prisoner." This is the wine that Juliet drinks, and the action of which the Friar Lawrence describes—

> "Through all thy veins shall run
> A cold and drowsy humour, which shall seize
> Each vital spirit; for no pulse shall keep
> His natural progress, but surcease to beat.
> No warmth, no breath, shall testify thou liv'st,
> The roses on thy lips and cheek shall fade
> To paly ashes: thy eyes windows fall
> Like death when he shuts up the day of life;
> Each part deprived of supple government,
> Shall stiff, and stark, and cold, appear like death:
> And in this borrow'd likeness of shrunk death
> Thou shalt remain full two and forty hours,
> And then awake as from a pleasant sleep."

It follows therefore from the history of scientific discovery that our modern great advance of removing pain during surgical operations is in fact, if not as old as the hills, as old almost as wine. But is the story true, you say? I answer yes, and the answer is from experiment. Thinking it a subject of very great interest, I instituted, a few years ago, an inquiry into the matter. Through the kindness of my friend, Mr. Daniel Hanbury, F.R.S., I obtained a fine specimen of mandragora root, and I made once again, after a lapse of probably five centuries, Mandragora wine. I tested this, and found it was a narcotic having precisely the properties that were anciently ascribed to it. I found that in animals it would produce even the sleep of Juliet, not for thirty or forty hours, a term that must be accepted as a poetical license, but for the four hours named by Discorides easily, and that in awakening there was an excitement that tallies with the same phenomenon that was observed by the older physicians.

Thus, one of the first uses of wine to man was amongst the most noble and beneficent that man, by his ingenuity, can confer on his kind, and if wine had ever been used in this way and in none worse, Pater Lenæus might have retained his supremacy in the good opinion of all the world.—*Dr. Richardson; Society of Arts.*

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

Sunday-Rest in Gas-Works.

New Orleans, March 4, 1874

Mr. Editor: I have just seen in your Journal of 16 February, Mr. Cathels's article commenting upon my communication on this subject, published in your columns August 17, 1874. Had Mr. Cathels really read my short contribution, he would have spared himself the labor of building up a man of straw, merely for the purpose of demolishing him. The whole strength of his argument depends upon an incorrect assumption of my position.

He says: "I had no idea that operations (in gas works) had been discontinued for the whole twenty-fours anywhere, until I read Mr. Forstall's letter." Now, where in my letter did he find any such statement? I wrote, explicitly, that in the New Orleans gas works Sunday labor had ceased "from 5 A. M. to 5 P. M.," or for *twelve hours*. This was the measure of relaxation which, after an experience of more than a year, I ventured to recommend, with the conviction that the practical benefits outweighed the objections urged against the change. With this conviction strengthened by the additional experience of another twelvemonth, I now say, "with all due deference to Mr. Cathels's opinions, that neither of his two objections is practically of any importance, and that nine gas works out of ten in the United States could give their stokers a rest of twelve hours every week, without material loss, if they choose to do so. The indifference manifested at the meeting which listened to Mr. Walker's convincing paper shows where the real trouble lies. Not one word of discussion followed the reading.

As a matter of fact, what does Mr. Cathels urge against the general adoption of twelve hours rest?

1. The clinker difficulty; which, he says, both Mr. Walker and I have "overlooked," but which is so formidable that it defeated his efforts to suspend Sunday labor. Mr. Walker tells us that ever since 1860 he has ceased work from Saturday night until Sunday night, *successfully*, without trouble from the heats. My own experience of two years shows it to be no difficulty at all, after a twelve hour suspension.

2. That only the day men are benefited by a 12 hour's rest. The answer to this is simply that "half a loaf is better than no bread." It is surely very strange reasoning that because we cannot do more than our means permit, we should not do anything. The night men of this week are the day men of the next, and are equally relieved during the year.

The last column of Mr. Cathels's article is devoted to an attempt to prove that men of average intelligence, sufficiently well paid for six days' labor, will naturally prefer to work seven days without rest. Because Mr. Walker and I disbelieve this, he charges us with being "carried off" with enthusiasm about Sunday labor, and belonging to the "goody family." This may raise a smile, but it is hardly argument. The paragraph quoted by him was based upon a statement made in the Gas Managers Meeting, that in a gas works in England the men themselves asked for a resumption of Sunday work; and the inference was clear that the application came from the very men who were directly relieved by the suspension. Mr. Cathels now states that he was connected with the works referred to, and explains that it was the *night men* who rebelled against the change, because of the extra clinkering thrown upon their hands, by the relief of the day men. So that my paragraph does them no injustice, as it does not apply to them at all, but only to such stokers as prefer the retort house to their own homes seven days in the week, if such there be. It is not disputed that retort house labor is very severe. Mr. Cathels admits that every man ought to have at least twelve hours rest every week. It is proved that this suspension of labor has been carried out, without loss, for many years in several gas works, one of which daily sends out in winter 1,000,000 cubic feet of gas. What more is needed to make the practice general? Mr. Cathels has answered the question: Only a little more "goodiness" and "enthusiasm" on the part of gas managers and engineers.

Our English brethren are already far in advance of us on this psint. In June, 1880. at the annual meeting in London, of the Bri ish Aseociation of Managers, Mr. Morton, of the London Gas Company, read a paper on "Sunday Labor," strongly advocating the justice of suspending work in the retort house. After a very interesting discussion, during which Mr. Livesey and other gentlemen enforced the same views, a committee was appointed to investigate the subject and report at the next annual meeting. Mr. Cathels was present, having read an excellent paper on "Retort Settings," but did not take part in the discussion. The committee prepared circulars containing questions, the replies to which would elicit the views of gas managers on the subject, and sent a copy to every member of the association. Seventy-one replies were returned, and from these the report of the committee was prepared. This report is not long, and would amply justify its republication in your columns, but I shall confine myself to a few extracts, merely to remind Mr. Cathels that he does not represent even the experience of "misty, foggy" London in this matter. I quote:

"One of the chief supposed difficulties has been the want of gasholder room, but your committee are prepared to say that only to a very limited extent is this a difficulty; in fact one case was mentioned where last winter Sunday work was stopped in consequence of there being insufficient room for the gas, had the retorts been kept working."

"The real question is one of retorts. If the number of retorts in use is such as to produce rather more gas each day than is consumed, the work on Sunday may be very well suspended."

"The plan of making up on Sunday for the deficiency of the week is manifestly wrong."

"It has been proved that clay retorts are not injured when left for twelve hours beyond the usual time, if the charges remain in, and the lids on."

"Your committee would urge upon their brethren the necessity of doing all they can to alleviate the *exhausting and monotonous labor of the stoker*, feeling quite certain that a movement of this kind, though entailing a trifling expense to the company, is productive of *much good that the gain far exceeds the loss*."

This report is signed by Mr. Livesey, chairman, whose South Metropolitan works are notoriously the best managed in London. It contains not one word about "clinker"; but many "goody" allusions to the "Sabbath" and Divine commands to keep it holy. These I have not quoted, being limited by Mr. Cathels to "dollars and cents tempered with kindness and liberality": and even on this ground I can afford to leave the sublect for the consideration of American gas managers.

Yours respectfully,

Theobald Forstall.

Coal-Tar Colors without Arsenic.

The London *Chemical News* says that Coupier, of Paris, was the first to succeed in producing fuchsine by the action, at a suitable temperature, of hydrochloric acid and iron in small quantities on pure aniline and nitrotoluole. Though Coupier's experiments were confirmed by Schutzenberger, who showed the aniline red obtained by Coupier's process to be identical with that usually manufactured, and found the yield somewhat greater than that obtained by the use of arsenic acid, the process was not applied industrially before 1872, when Meister Lucius, and Bruning, of Hoechst, Germany, succeeded in working it on a large scale. This firm, however, appear to manufacture their colors only in part by this method, as they still supply the market with dyes containing arsenic.

More recently, the Gesellschaft fur Anilin Fabrikation, of Berlin, have erected new works, where no arsenic acid is used in the preparation of colors. Not only fuchsine (rubine), but all the colors derived from it which are manufactured by this company are warranted to be produced without the employment of arsenic, and to be entirely free from this poisonous reagent.

The Berlin Company are working Coupier's process with several important modifications, and produce from 200 to 300 kilogs. of fuchsine per diem. Some specimens of fuchsine and other colors manufactured by this company appear to be products of unrivalled beauty, purity, and strength. The fuchsine is stated to be not only purer, but stronger than that made by the aid of arsenic acid, and is the pure hydrochlorate of rosaniline. The rosaniline base, from its great purity, is admirably adapted for the preparation of aniline blue, and is largely used by other manufacturers of aniline colors.

Being free from arsenic, these dyes are not only fitted for coloring sweetmeats, liqueurs, syrups, and pharmaceutical preparations of every description, but may be used in many other industrial purposes where poisonous colors would be more or less dangerous, as in the staining of paper, paper-hangings, toys, etc.

It is to be desired that other manufacturers of these dyes will adopt the new method, and relinquish the old arsenic acid process, which, apart from the inconveniences it has caused both manufacturers and consumers, has led to many lamentable accidents.

Peculiar Garbon Mineral.

Professor E. J. Mallet has examined, as we learn from our exchanges, a coal from the Middle Park, Colorado. He says that it possesses much in common with albertite, and also with what is known as torbanite. These two varieties are highly valued by gas manufacturers, who mix from five to twenty-five per cent. of these bituminious compounds with less bituminous coa, thereby greatly increasing the yield and quality of the gas. It resembles the former in the large amounts of gas and tarry oil it yields (which may prove as valuable as that derived from albertite), but differs from it in being heavier—the specific gravity of the albertite being 1·090, while this is 1·323—also in yielding no soluble products when treated with bisulphide of carbon, spirits of turpentine, ether, etc. From torbanite it differs, in not crackling in the fire, in being much heavier, and in melting and intumescing when heated. Analysis shows it to contain in one hundred parts 6·02 per cent. of water and moisture, 39·95 per cent. of volatile matter (gas and tarry oil), 54·03 per cent. of fixed residue, consisting of coke and ash.

[Instead of "much in common," our deduction from the above would be that this coal, or whatever it is, differs essentially in almost every particular, both from albertite and torbanite.—Ed.]

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TUESDAY, MARCH 16, 1875.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

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THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

We congratulate our readers on the fact of our presenting them—for the first time—a detailed account of the Proceedings of the Annual Meeting in Boston of this distinguished Association, last month; a privilege for which ourselves and readers are indebted to the obliging courtesy of the accomplished Secretary, George B. Neal, Esq., of the Charlestown (Mass.) Gas-Light Company, who has taken much pains to furnish us this Report. In completing this Report, in our next issue, we shall present a valuable communication made on the occasion by Col. James H. Armington, formerly of Providence, R. I., but now Chief Engineer of the Brooklyn City Gas-Light Company; on the subject of "Spontaneous Combustion." We shall also give a full list of the members of the New England Association, and the Constitution of the same; and, as is best, we shall till then defer some words we have to throw out in reference to the subject in general.

GAS-ANALYSIS.

In a recent issue—now two months since—an effort was made by the Editor of this Journal, to introduce to the gas-public, throughout the world the above subject in an aspect possessing certain points of novelty. Hitherto, most operations, of a quantitative analytical kind, upon gases, have been purely of the volumetric species; but in this memoir of the Editor, there have been brought forward *gravimetric* methods, or methods by which the constituents of the gas to be determined, are reduced to forms that can be weighed on delicate balances. It is believed that the introduction of this class of methods largely into all operations of gas-analysis, whether of illuminating, or of furnace, or of other gases, will lead to great advantages, in the way of certainty, practicability, accuracy and ease of execution.

This memoir has now been copied, in a form considerably improved and amended (by the author), in the London *Journal of Gas-Lighting* (Issues of Feb. 16 and 23, 1875, pp. 217 and 254), a courtesy for which the author desires to make public acknowledgment. It will also be soon reproduced—in the same revised form—in the *Journal of the Franklin Institute*, and in the *American Chemist*; and will thus obtain circulation among the analytical chemists of this country.

A justly-distinguished American, now gone from among us—by pseudonym Artemas Ward—once said, in reference to comic periodicals, that if they would occasionally, even though exceptionally, admit into their columns a joke, it could not but lead to satisfactory results. We feel almost justified in applying the moral to many Gas-Works—speaking not for America alone but for Great Britain as well. Would it not be likely to help things, were they to admit a little scientific chemistry, even if they took it only in very small and gradual doses, into this eminently chemical art.

We must, however, put it forth as our solemn conviction that the blame for this state of things does not rest altogether, or even mainly, with the gas profession, either in this or the mother-country. We believe it is at least largely to be attributed to chemists themselves. This idea is not here first propounded. The London *Chemical News*, a journal peculiarly "posted" on such topics, said nearly a year ago, in reference to this very question (in its own land), while reviewing Newbigging's recent "Handbook":

"Gas manufacture is essentially a chemical art. The original decomposition of the coal, the purification of the gas, the separation and utilisation of the by-products, are all chemical processes. Mechanical operations play a very subsidiary part. Yet the conduct of this manufacture has fallen exclusively into the hands of engineers. The work before us is written by an associate of the Institute of Civil Engineers. It is dedicated to the President of that body.

"We will venture to say that, unless chemists follow the example of all other professions, and organise themselves, the encroachments made upon them by medical practitioners, by pharmaceutists, and by engineers, will ultimately cut away the entire ground from under their feet."

The "organizing" of chemists that is here called for aloud, is doubtless one of the desiderata, and the first one, in order; but it is not the only one. In America, however, we must add that even this first step is not yet even in prospect. In Great Britain chemists have already organized, and joined forces, for many purposes. Here, alas, we discern no present symptom of any such possibility.

A "CARD" FROM PROF. SILLIMAN.

The friends and acquaintances of this gentleman, numerous in the gas-profession, and among our readers, will be pleased—as he himself is—to know that the unjust reports regarding his professional connection with the "Emma Mine," are soon to be cleared up and swept away by judicial investigation; which will prove, among other things, as we learn, that this gentleman never had any connection, of any kind, with the *vendors* of the mine, that he was engaged professionally by the *buyers*, and that the latter departed from his advice in paying three or four times his estimate of the ascertained value of the property. The following announcement from the Professor himself, appeared more than a month ago:

To the Editor of the Tribune:

SIR: The publication of the complaint of the Emma Mining Company against Trenor W. Park and others, in your issue of Feb. 4, affords me an opportunity of which I avail myself to say:

1. That every charge contained in that complaint, or emanating from any other source, imputing to me fraud, complicity, or other improper act, either in connection with the examination of the Emma mine, with its sale, or with the owners thereof, or any of them, is false and untrue in every particular.

2. I earnestly hope that the action now begun will be pressed to a speedy trial, and that a thorough and exhaustive judicial investigation may be had of all these charges. So far as I am concerned, I am prepared, whenever and wherever such an investigation is had, to meet and answer these charges fully, fearlessly, and I am confident, satisfactorily.

Yours respectfully,

New Haven, Feb. 4, 1875. B. SILLIMAN.

THE NEW ORLEANS LITIGATION.

We have in previous articles kept our readers posted regarding the progress of this singular matter, in which a new gas company claims to have acquired the right, by legislative action, absolutely to oust, shoulder aside, ignore, and reduce to a nonentity, all the rights, franchises, and corporate existence of an old established company that has served the public long, faithfully and satisfactorily. Gas-circles throughout the country were recently agitated by news that a final decision, as supposed by many, had been rendered in the case, by the Supreme Court of Louisiana "Justice Wyly"; which swept away the New Orleans Gas-Light Company utterly, confirming the new Crescent City Company in all its claims and assumptions. The closing paragraph of that decision (the whole occupying nearly four solid columns of the *Bulletin*) we quote, to show how this apprehension was apparently justified.

"It is therefore ordered that the judgment herein be set aside and annulled, and it is decreed that the plaintiff, the Crescent City Gas Light Company, have the sole and exclusive right to make and sell illuminating gas in the city of New Orleans for fifty years from April 1st, 1875; that the act of March 1st, 1860, extending the charter of the defendant, the New Orleans Gas Light Company, from April 1st, 1875, until April 1st, 1895, is unconstitutional and void; and

that the defendant be enjoined and inhibited from setting up any claim thereunder, or from attempting to carry on the operation of gas works or the business of making and vending gas after the 1st of April 1875, or from in any manner impeding the plaintiff from the full enjoyment of its franchises, rights and privileges arising under the acts of April 20 and July 10, 1873. It is further ordered that the intervention of the State be dismissed with costs, and the demand of the intervenor, the city of New Orleans, be rejected with costs of its intervention. It is further ordered that the defendant pay costs of both courts."

Not content ourselves to accept this, as a finality, we sought to obtain some authentic information through private correspondence. Our correspondent, who is inside the matter, states the real matter of fact "in a nutshell," and we reproduce his words, to show that no great murder has yet been committed.

"The whole question was narrowed down to a mere interpretation of the meaning of one word in our State Constitution. The lawyers have argued over it for three years, and will continue to do so for three years longer."

LATER.—Very interesting and important advices have come from New Orleans since the above was written, but just too late for insertion. It seems that it depends on the Supreme Court at Washington, whether or not that city shall *cease to be lighted at all after April 1st!*

FOOD-ADULTERATIONS.

A movement in the New York Assembly, by one Mr. Prinnce, in the direction of legislation "for preventing adulteration of food, drink, and drugs," which, did we happen to feel in an optimistic humor, and disposed to be "fooled to the top of our bent," might supply us with a very flattering unction indeed: but, unfortunately, Mr. Prince's bill does not bear examination. Even the newspapers have found this out.

Some remarks we have made in another article, anent the question of urban gas-inspection and regulation,* have a certain bearing and application here also. It is evident at least that the pending adulteration act at Albany has been drawn without consultation with those who are familiar with the history of the subject in other countries, and who have followed up the difficulties and the struggles that have been gone through with, in Great Britain for example, in arriving at practical *working* laws regarding adulterations; for if such a law is impracticable, as Mr. Prince's law certainly would be, it could be nothing but a dead letter. This is one of those cases in which [we might say, not exactly *Fas est ab hoste*, but certainly *Fas est ab alieno doceri*.

The British Adulteration of Food Act passed Parliament, after much tribulation, in 1872; and now, in three years working, defects and imperfections have been discovered, which have rendered necessary its complete remodelment. One difficulty, certainly fundamental, has been that nobody could give a reasonable definition of what adulteration essentially consists in. Thus, in a public address, last October, a distinguished English chemist, John Pattinson, said: "There can be no doubt that great injury and injustice have been done to many honest traders by the way in which the provisions of the act have been carried out." He gives many examples.

This subject has assumed so great importance in England now that a public Association of Chemists of high standing has just been formed, to discuss and investigate the many questions that have, and will come up. We can, on this occasion do no more than introduce it to our readers, in these few words, but shall return to it often again. It belongs fully to the specialties of this Journal, as being one of those numerous *practical* sanitary questions, outside of pure *medical* theory and practice, of which this Journal is in this country the only exponent.

MR. SMEDBERG'S COMMUNICATION IN OUR LAST.

We have a communication from Mr. St. John, which arrived just too late for this issue, in reply to that of Mr. Smedberg in our last. It will serve for the next number.

* This article has unfortunately been crowded out. —PUBLISHER.

Erratum.

Into one of our "Gas Items" in the last issue there crept an error of the types of so absurd and vexatious a character, that we must call especial attention to it. It was stated that the ordinary charges of the Metropolitan Gas-Light Company of New York are $5·75 per thousand. It should, of course, have been $2·75.

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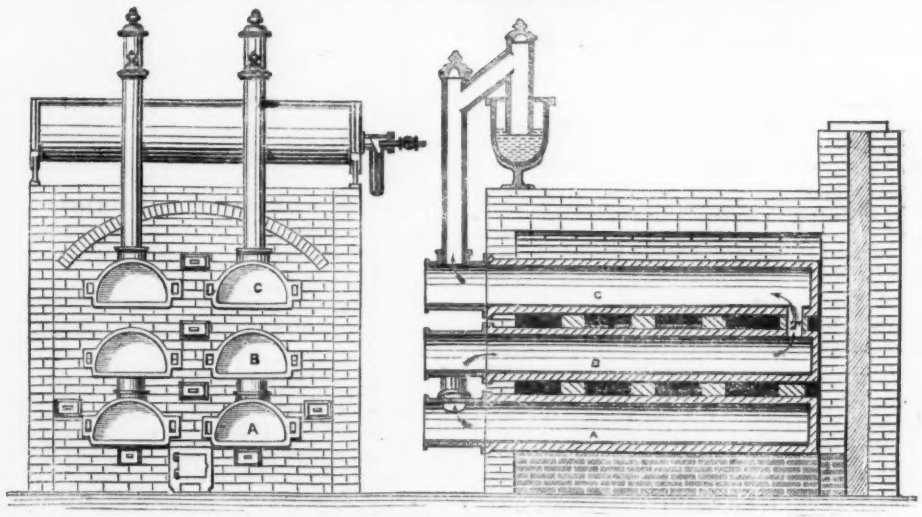

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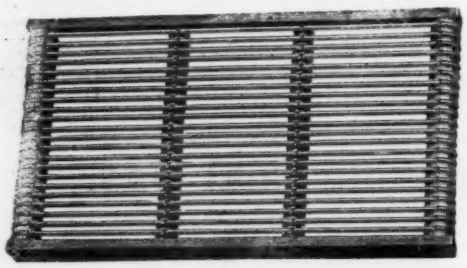

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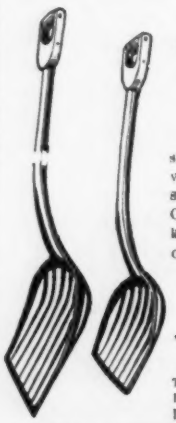

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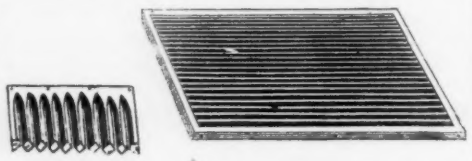

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Retorts, Etc.—Geo. C. Hicks & Co., Baltimore Md..... 4

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Patent Lamp Post—J. W. Graham, Chillicothe, Ohio, or A. M. Callender, office of this Journal..... 9

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Gas-Light Company of America, 63 and 64 Drexel Building. New York..... 2
Kidd's Gas Consumers Guide—A. M. Callender & Co., 42 Pine Street, N. Y.....
Massachusetts Institute of Technology—Samuel Kneeland Boston, Mass.....
National Coal Gas Company—H. P. Allen, 4 Warren street New York..... 6
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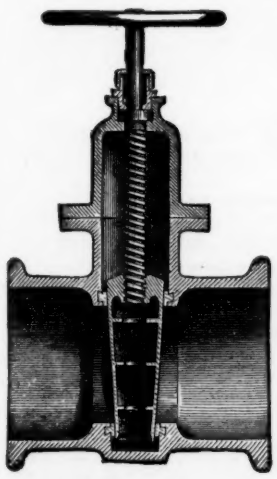

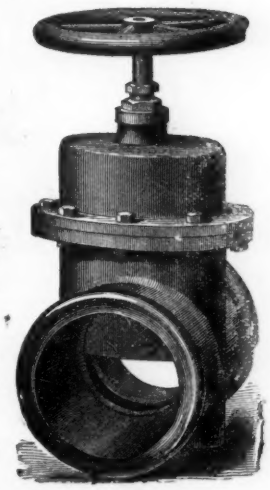

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They afford a direct passage the full size of the pipe. The seats are made of an alloy similar to BABBITT metal, specially prepared for the purpose, and superior to all other metals used for the seats of Gas Valves. It does not corrode under any circumstances to which it is exposed.

There is NO LIABILITY OF COHESION between the Gate and Seat, and the Valves can be relied upon to SHUT TIGHE and OPEN EASILY at all times—an important desideratum when used for street mains, in cases of fire.

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CITIZENS GAS-LIGHT COMPANY, BROOKLYN, N. Y.
SOUTH BOSTON GAS-LIGHT COMPANY, BOSTON, MASS.
CHARLESTOWN GAS-LIGHT CO., CHARLESTOWN, MASS.
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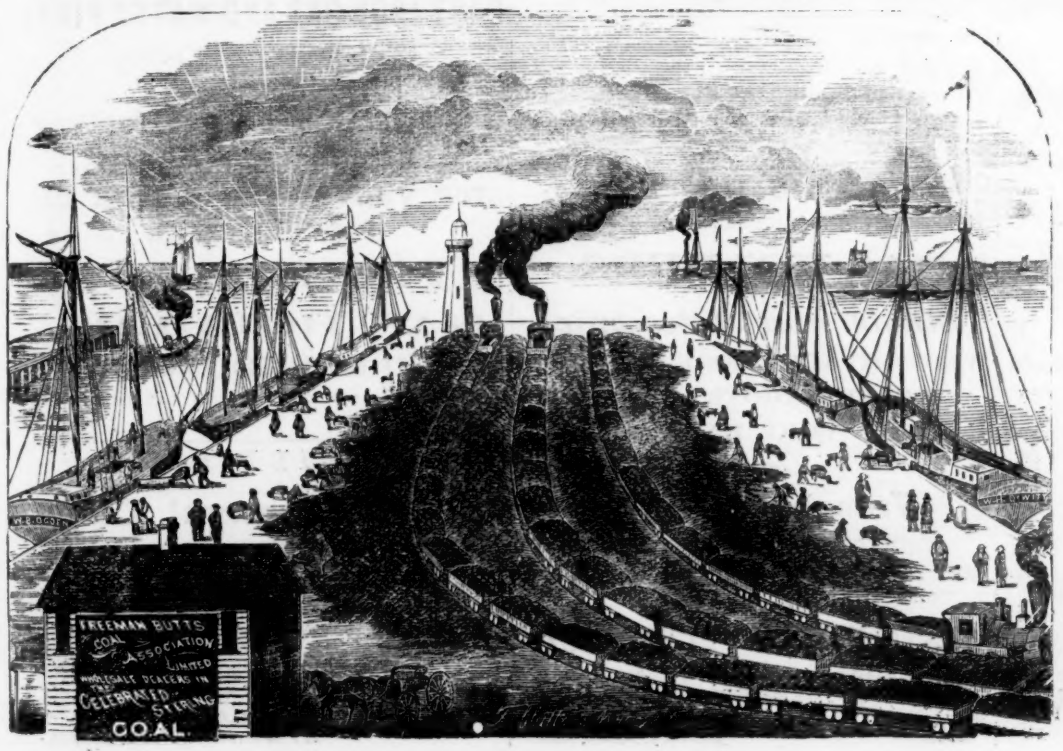

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From Manhattan Gas-Light Co., N. Y.

Yours of the 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactory—averaging 9,500 cubic feet of 15 candle gas per ton of 2,240 lbs., and 41 bushels of coke weighing 1465 lbs. We consider it among the best American Gas Coals for the quantity and quality of the gas produced, and also for the excellent quality of the coke.

I am, gentlemen, your obedient servant,
CHARLES ROOME, Pres't.

From Buffalo Gas-Light Co., Buffalo, N. Y.

The Sterling Coal we have had from you we find to be an excellent gas coal. The yield of both gas and coke is good. The illuminating power of the gas is high and the quality of the coke is very good.

ROBERT ROBSON, Foreman Gas Works.

From Citizens Gas-Light Co.

ROCHESTER, N. Y., Sept. 2, 1874.

Your favor September 2nd at hand. Yield of Sterling Coal to date from July 19, 4-70.

Respectfully yours,
WM. H. WARD, Sec.

Would also refer to the Gas Companies in the following places: New York City (Manhattan and New York Cos), Brooklyn, Albany, Troy, West Troy, Buffalo, Rochester, Oswego, Ogdensburg, Lansingburgh, Newburgh, Rome, Palmyra, Geneva, Yonkers, Rondout, Kingston, Albion, Brockport, Seneca Falls, Elmira and Lyons in State of New York; Cleveland, Toledo, Sandusky, Norwalk, Oberlin, Salem and Fremont in Ohio; Detroit, Ann Arbor, Grand Rapids, Kalamazoo, Jackson and Adrian, in Michigan; Toronto, Hamilton and Coburg in Canada; Chicago, Ill., and two companies in Milwaukee, Wis.

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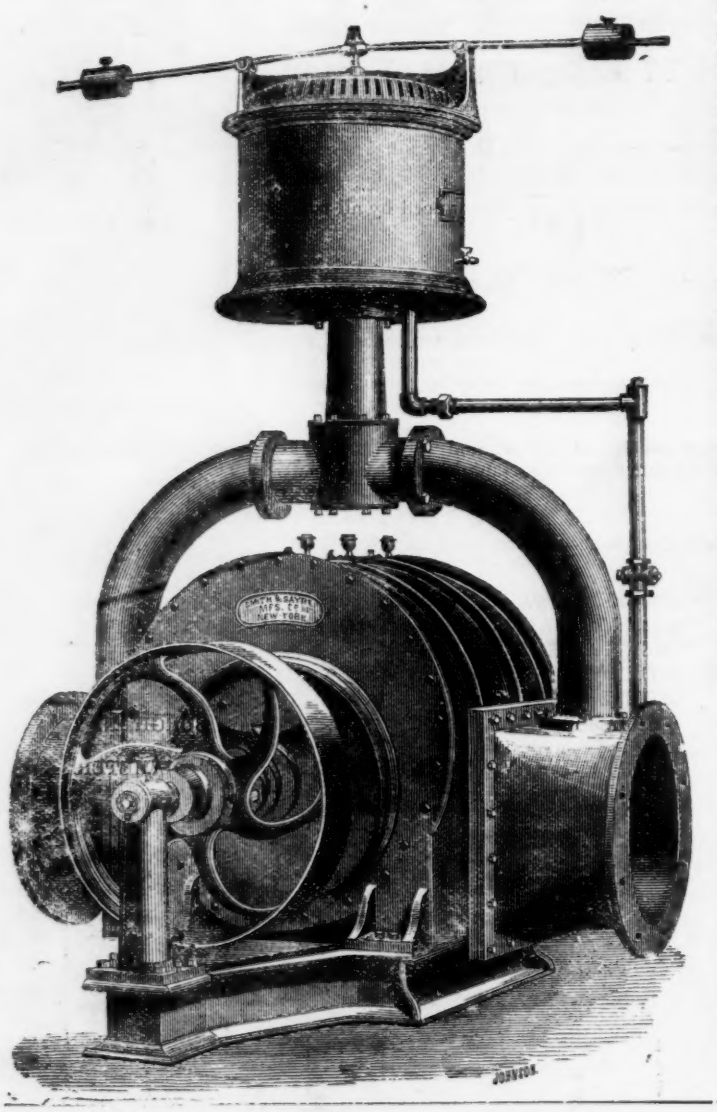
And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-jo nts, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

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A YOUNG MAN OF LIBERAL EDUCATION, WHO HAS spent many years in the study of gas, and working in a large gas works, desires a situation as Superintendent of a works making 10,000 to 50,000 cubic feet daily. Has good reference as to ability; or would act as Assistant in large works. Would prefer a situation on the staff of a gas works builder—draws well, and has experience in setting up apparatus. Address, stating salary, C. P. V., care of W. B. CARPENTER & Co., Cincinnati, Ohio. 873

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1842. *1874.*

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Ince Hall	$17 00	@	18 00
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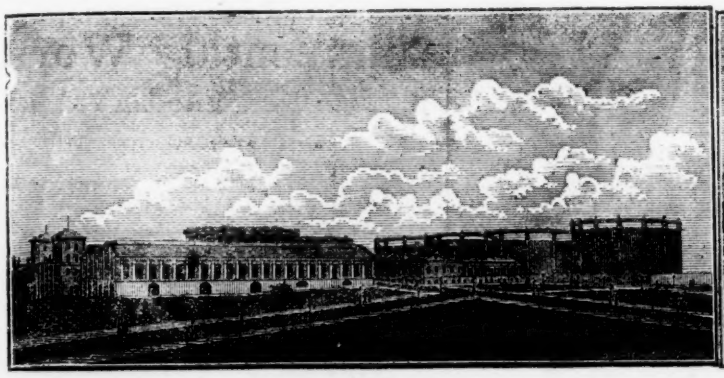

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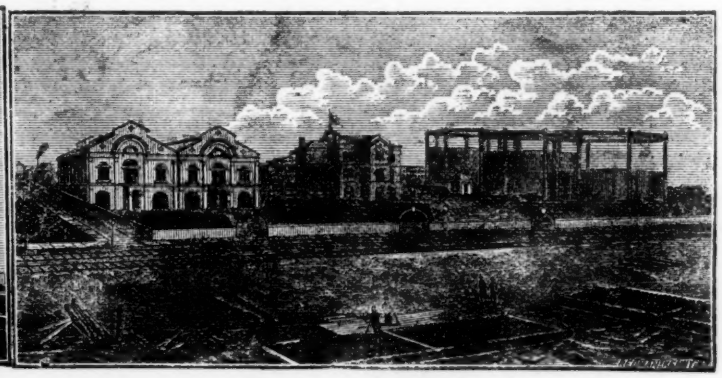

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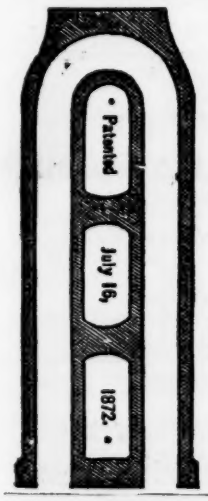

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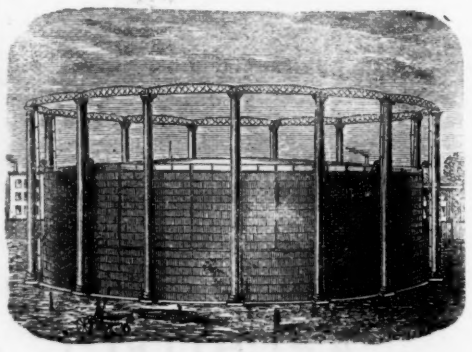

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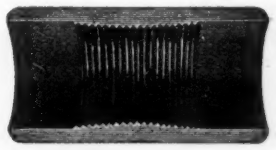

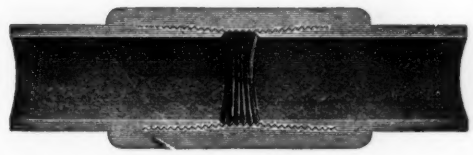

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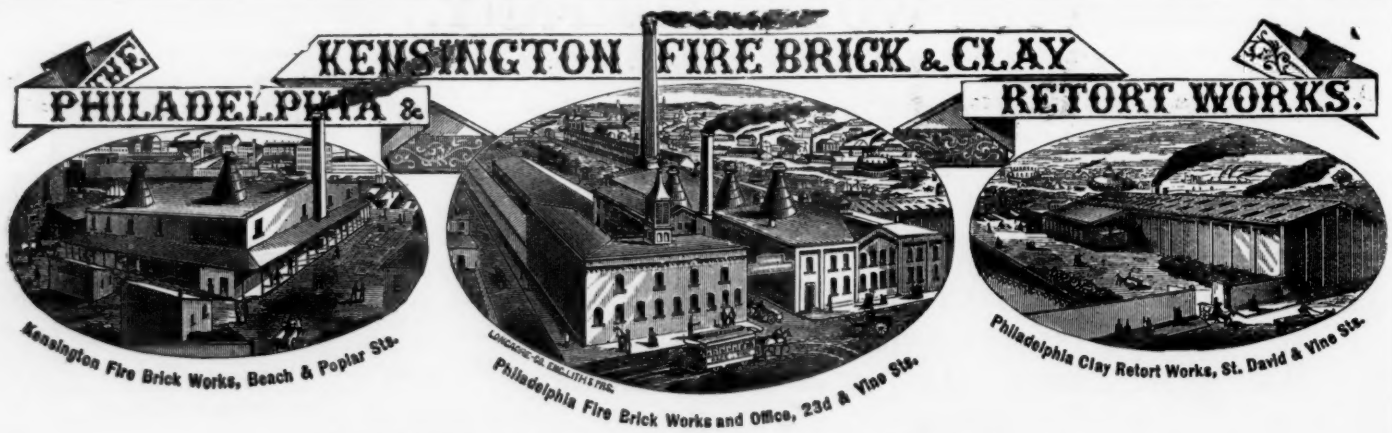
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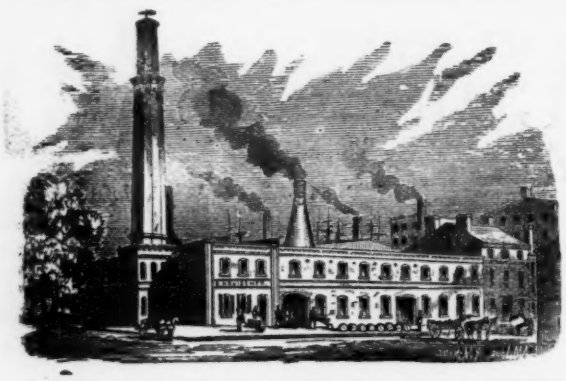

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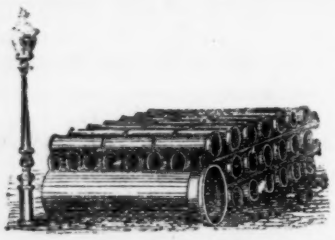

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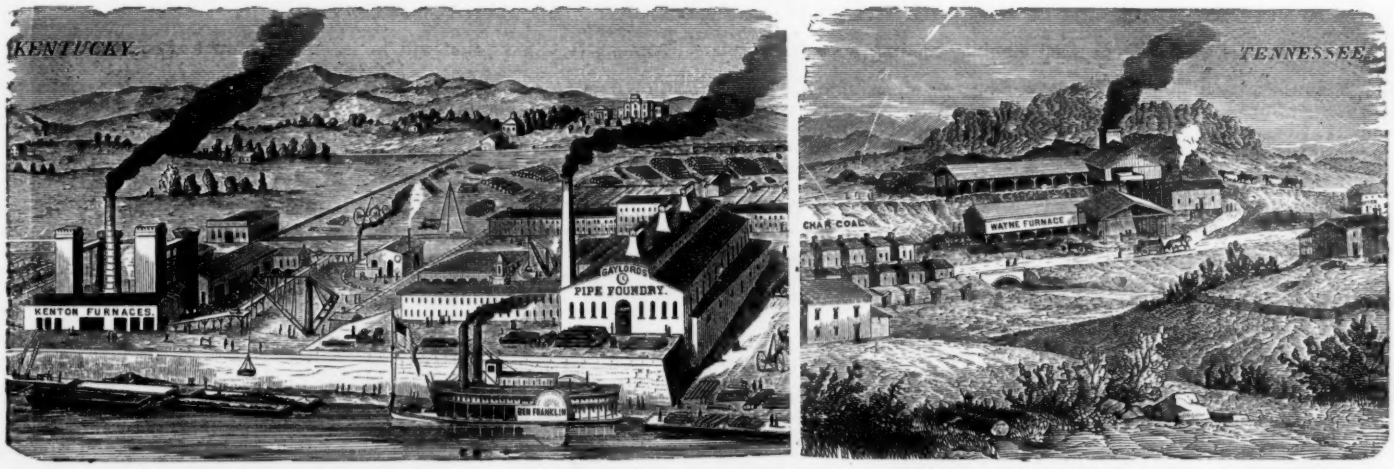

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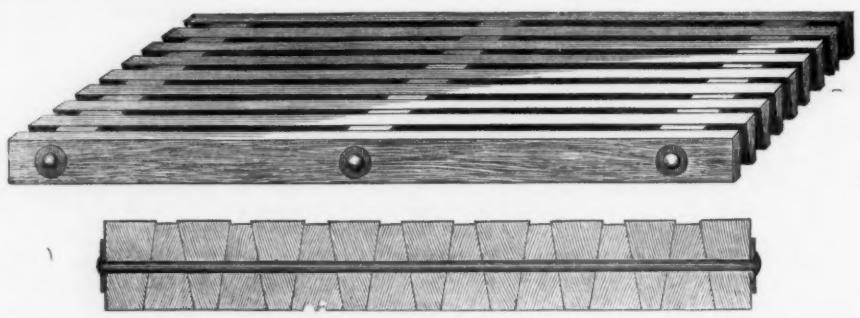

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